

Apart from the large increase of the relative number of capital operations, from the new classes of cases now relieved by surgical means, I observed a decided change for the better in the after treatment of those operated on. They are subjected to less active antiphlogistic treatment, and less rigorous confinement, than was formerly believed to be necessary.

The pathology of strabismus has been re-studied, and the operations for its relief are done with more certainty, since the indications are more accurately determined. Staphyloma is also removed in a manner to leave the eye-ball in a better condition for avoiding sympathetic inflammation of the other eye, and to give a better stump for the support of an artificial eye, should the patient choose to wear one.

The days for operations vary at the different clinics; so that by attending them in turn, more or less operations may be witnessed nearly every day.

At present, a student may have, at Paris, an opportunity for becoming acquainted with the new theories and modified practice of all the eminent men of other continental cities, as well as the skilful example and teachings of those who represent what may be termed the French school.

Truly yours, H. W. W.

Berlin, Prussia, 4th July, 1863.

ON MYCETOMA.

By H. V. CARTER, M.D. LOND., ASSISTANT-SURGEON BOMBAY ARMY.

IN the following remarks it is proposed to give some account of a very serious disease widely prevailing in India, and in its nature and pathological characters well worthy the attention of the surgeon and naturalist. "Mycetoma" stands for a form of swelling which is caused by the growth of a fungus. The term is sufficiently expressive, and briefer than, if not otherwise preferable to, that of "Fungus disease," under which I at first described the affection. Since those observations were made (March, 1860) many facts have come to light which almost complete the natural history of mycetoma, so that it may not be premature to offer the following as at least a basis for subsequent research.

A condensed description of the pathological characters of the disease, and a short account of its natural history, will be presented in succession; the facts upon which both are founded being entirely derived from personal observation.

I. The feet and hands are the only parts attacked; but this feature of the affection, as also its local or endemic character (which must still be called Indian), may require to be modified in the course of time and after more extended observation. Patients present themselves with a foot or hand (generally the former) much swollen,

of a dark color, and studded with numerous sinuses; the form of the swelling is more or less globular, and as to its extent, the whole of the member, or one side or part only, may be implicated. In the former case the projecting fingers appear to be imbedded, being themselves generally free; and the sole or palm is flat or even convex. Seldom does the disease extend much beyond the ankle or wrist, and its whole appearance, at first sight, somewhat resembles a long-standing scrofulous affection. The sinuses are considerable in number, and often clustered together about the sole, ankles, or dorsum of the foot; some are simple openings, others are raised upon soft elevations or present a pouting edge. The appearance of the more recent, especially in preserved specimens, is characteristic, being circular in form, from one third to one half inch in diameter, and gradually deepening towards the central aperture, from the removal of successive layers of cuticle; white patches are frequently seen around. The size to which the swelling may attain varies; in advanced cases its circumference may be eighteen inches, or upwards, and the form is then hugely misshapen.

Any one who is acquainted with the fungus-disease could not mistake it, when tolerably advanced, for ordinary caries; the size of the foot, its globular form, and the number and appearance of the sinuses, being the chief diagnostic characters; to which may be added, the absence of a corresponding degree of constitutional disturbance, pain, or hectic fever, and the patient is generally of a scrofulous or syphilitic taint. But there is one test which is applicable in almost all cases, and that is the character of the discharge. Sometimes the fungus-particles are so abundant as to block up the apertures of the sinuses, or float away in numbers in the thin serous or sero-purulent fluid, and when less numerous they may generally be detected with the aid of a lens. In the black variety a single glance will be sufficient, and in the pale and soft (which have been well compared to mustard or poppy seeds), their appearance is hardly less characteristic. The presence of these particles in the discharge from the sinuses is an infallible test of the nature of the disease; and by the use of the microscope I was very early enabled to make a correct diagnosis in a rather obscure case, but generally this aid is not required. The external appearances of mycetoma appear to be the same, whatever the form of fungus-growth. The sinuses are the terminations of canals, more or less lengthy and tortuous, which occasionally lead to bone; but the latter will not usually yield to pressure of the probe, for it is not really in a carious condition, although partly absorbed.

A section of a foot thus affected presents, on first view, much confusion of parts. The skin is greatly thickened, and the bony, muscular, and fibrous tissues seem blended and intermixed with a glairy or tenacious slough-like material, of reddish or greyish tint; globular masses of fungi, too, are seen scattered about, which are either

yellowish and of cheesy consistence (the so-called tubercles?), or deep brown or black, and much firmer. With a little attention, however, the following arrangement becomes evident: the collections of fungi are lodged in spherical cavities hollowed out in the osseous cancellous tissue, or in the soft parts, from which "loculi" branching tubular canals pass off, frequently inosculating, and terminating either in closed expanded extremities or on the surface at the sinus-apertures. These canals, like the loculi, are lined throughout by a membrane, easily separated from the bone or blended with the softer tissues, and they also contain fungus-particles imbedded in the soft or glairy material above mentioned; it is evident that their office is to conduct the fruits of the vegetable parasite to the external surface, where they are expelled in the serous discharge. A varying amount of inflammation, with its results, attends the growth of these foreign bodies, and the bones of the foot and leg, or of the hand, are affected in a striking manner, which, however, need not here be described; the spherical cavities which they contain are the most peculiar feature, and caries, or ulceration of the articulations, is seldom present, absorption from pressure being the only agent at work.

Mycetoma makes its appearance by a small, flattened, indolent tumor or "lump," firm to the touch, little painful, and of slow growth. In the course of a few months raised soft spots, or blebs, or vesicles, arise, which soon burst and let out the fungus-particles; sinuses thus are formed, and persist until all are expelled; meantime the swelling enlarges, or fresh ones appear, and so the disease progresses. The commencement is often on the sole of the foot; or, in the case of the hand, one of the fingers may be first attacked, as a most interesting specimen in my possession shows.

The natural duration of the disease is prolonged, the cases ordinarily seen being of from four to ten years' standing, and sometimes longer; its termination seems only coeval with exhaustion of the vital powers. A spontaneous cure must, I think, be exceedingly rare, though doubtless within the range of possibility. Some idea of the frequency of this unique affection may be gained from the fact that individual observers in this country have reckoned their cases by the score; one gentleman sent me particulars of seventy-five cases he had treated, and even in Bombay a year seldom passes without three or four cases being seen at the Jamsetjee Jejeebhoy Hospital, although the disease is not endemic here. It has only been seen in natives hitherto, the explanation of which is obvious, as they alone go barefooted, and seldom wash the feet thoroughly. Other noteworthy features are the following: it has mostly a single local-manifestation; it is much most frequent in men, and during the middle periods of life, and commonest amongst the agricultural classes; it is not hereditary, or peculiar to any diathesis. In all these particulars, as well as in its endemic character, the fun-

gus-disease resembles the guinea-worm disease, and is unlike scrofulous affections, leprosy, elephantiasis, &c.; it is indeed a much more serious affection than the Dracunculoïd, and merits far more the attention of medical officers in India.

As to treatment, amputation is a certain cure, so long as every part invaded by the growth is removed, and it is necessary to mark this, as partial amputations have failed. Were it possible (of which I have strong doubts) to destroy the vegetable growth by local applications or injections, this plan might be adopted previous to the more serious procedure; a very intelligent graduate of the Grant College sent me word that he thought he had eradicated the disease by the free use of strong nitric acid, but time must tell how far such means are really available; the wonderful fecundity of the parasite and its deep penetration into the tissues, seem to me almost insuperable obstacles.

II. *Description and Natural History of the Fungi*.—These foreign bodies—the sole cause of disease—are not of a uniform appearance; but as the history, course, and appearance of the disease seem to be in all cases the same, so, it may be inferred, is its exciting cause; and it is well known that these low-organized growths are susceptible of great modifications according to external circumstances; some experiments, to be presently mentioned, indicate, moreover, a common origin of the two most frequent forms of fungi. Of the three varieties distinguished below, two were first noticed by myself, and I also was enabled to detect the real nature of the second or most common, which had been previously described by my colleague, Dr. G. R. Ballingall, and by him submitted to the late lamented Professor Quckett,* without, however, a definite opinion being elicited of its character.

1. The black fungus occurs in more or less spherical masses, attaining the size of half an inch in diameter; outer surface of a jet-black color, and minutely tuberculated; section of a rich deep brown, and radiated in aspect; consistence very firm, friable, and readily yielding along the radii, sometimes tearing like decayed wood. Structure of closely aggregated fasciculi (diam. $\frac{1}{10}$ to $\frac{1}{8}$ in.) cylindrical, beaded, branching and blending, and radiating from a common centre; they are composed of pale, homogeneous fibres (diam. $\frac{1}{100}$ to $\frac{1}{50}$ in.), and at their peripheral extremities expand into firm, rounded "heads" of a deep black color, to the varying projection of which the tuberculated character of the exterior is due. These globular expansions (diam. $\frac{1}{10}$ to $\frac{1}{8}$ in.) are also found at the ends of the shorter branches, and are composed of closely packed cells (beaded cellular filaments?) of an orange tint, interspersed amongst which are larger, thick-walled cells (abortive sporangia?).

* I would here beg permission to add my testimony of respect and regard to the memory of that amiable and talented man, in whose society I passed many profitable hours during the time I held the Studentship of Anatomy in the Royal College of Surgeons.

These larger masses occupy the "loculi" before mentioned, and seem to break up into smaller fragments, each of which corresponds to one or more of the globular "heads" thus become detached; and these black particles, incalculable in number, crowd the canals or sinuses on their way to the outer part of the body; they are somewhat larger than a pin's head in size, and may alone be present in the foot. Containing the reproductive elements, these black particles will, under favorable circumstances, germinate, and we then find a red mould-like fungus spring up; this is probably the parent, so to speak, or normal form of the black fungus of mycetoma. The latter also occurs in another condition, having undergone degeneration (fatty) in the foot, leaving lighter colored masses, crystalline in consistence (stearine or margarine?) and devoid of structure; this change is an approximation to the next variety.

2. Small masses of cheesy consistence and light-brown tint, formed of an aggregation of granular particles, and occupying the same "loculi" as the above. The granules or particles are quite visible to the unaided eye, and resemble poppy seeds; their number is immense, and they are freely discharged by the sinuses. Each consists of numerous minute rounded or angular bodies (diam. about $\frac{1}{32}$ th in.), which are enveloped on all sides by a deep crystalline fringe (stearic?), thus presenting a curious appearance, enough to perplex both Dr. Ballingall and Professor Quekett, more especially as the rounded bodies appear to be structureless, or only finely granular. It was not until I met with a specimen of this variety of mycetoma, in which the fungus particles were free from the crystalline fringe, and still showed a cellular structure, that I learned the true nature of these bodies; they are degenerated fungi. In their interior may sometimes be seen clear nucleus-like forms, which somewhat resemble spores, but which are probably oil globules.

3. Once I found countless minute pink-colored particles, visible to the eye as reddish grains (like Cayenne pepper), and when magnified exhibiting a bi- or multi-partite aspect of regular arrangement; when single the particles were oval, and resembled, more or less, in size and structure, the bodies just described, but they possessed the property of multiplying themselves by subdivision, and their color was different. The cellular structure was not apparent, but I conclude that it once existed. The crystalline envelope was absent, though, as in other cases, much free fat (also of a pink tinge) was seen.

On the present occasion it is not necessary to enter into further details respecting these parasitic growths; I hope one day to record the results of closer examination, and now proceed to offer a few remarks on the natural history of mycetoma.

It may be regarded as certain, that the hand or foot becomes accidentally inoculated with the spores of some mould or mould-like cryptogam, which at certain periods of the year—most likely previ-

ous to or during the wet season, when all kinds of fungi abound—makes it appearance on the soil of particular localities: the naked, unwashed feet of the agricultural laborer must be peculiarly liable to such contingency, and it is not necessary to infer the pre-existence of an artificial abrasion of the cutaneous surface, as the spores are quite capable of passing into natural apertures—e. g., the sweat ducts. In many specimens I have noticed pinkish streaks in the substance of the skin and subjacent tissue, on the sole of the foot, &c.; and on further examination, finding these streaks to contain numerous spore-like cells in various states of growth, I conclude that they constitute the first stage of development of the disease.

As to the specific character of the parasite, I was at first strongly inclined to compare the fungus of mycetoma with the "rusts" and mildews which attack so many cereals and grasses, and to ask if it is not possible that the species infesting common Indian grasses, &c. (e. g., sorghum, maize), if transplanted into the human foot, might not give rise to the disease; but more recently, as the result of further inquiry, and in deference to the opinion of Rev. M. J. Berkeley, our great British authority, with whom I have had the advantage of corresponding on this subject, I am inclined to surmise that the human fungi correspond to those imperfect states of ordinary moulds, &c., which have been distinguished by the term "sclerotia." Under certain unfavorable circumstances, the mycelium of the mould ceases to put forth the organs of fructification, and assumes the form of a firm, compact, cellular substance, capable of resisting adverse influences, but also susceptible, under more favorable circumstances, of again developing into the normal or fundamental species—a phenomenon essentially analogous to what occurs in the lowest forms of animal life, and, in a far less degree, to the hybernation of some of the higher.

Now it happens, that on several specimens of mycetoma, placed in spirit or water shortly before the monsoon season, a red mould has appeared on the exposed surfaces, whilst other preparations, similarly placed, have not shown any such appearance; again, fungus-particles from the foot, set in moistened rice-paste, have also given rise to the same mould, whilst plain rice-paste, placed side by side, has been either unaffected or only yielded common forms. I have recently ascertained this fact, with respect to both the chief varieties of the disease, and it throws clear light upon the origin and nature of this destructive parasite.

Mr. Berkeley's opinion is to the same effect, and he informs me that he should name this red mould *Chionyphe* (mucor?) *Carteri*; I had not ventured, from want of practical knowledge, to suggest a name, although the fungus was fully referred to by me last year (1861).

It cannot be denied that this mould has not been seen in its natural locality, and also that cotton soil from the affected districts

has failed to yield it when moistened and exposed to air; but the observations and experiments that have been made are as yet too few and incomplete to enable us to speak positively on this part of the subject.

Did space permit, I should gladly point out the numerous analogies that exist between this unique parasitic affection and other entophytic and entozoic diseases, all of which, it seems to me, to transcend, in both interest and importance; but I trust enough has been said to afford some idea of its appearance and characters.

Note.—Further information may be found in the last three volumes of the "Transactions of the Medical and Physical Society of Bombay," especially No. 6, and Mr. Berkeley has just published, in the "Intellectual Observer," a short description of the fungi, based chiefly on my memoirs, and illustrated by figures which, to a certain extent, agree with my own, but partly differ; the characters of *Chionophye Carteri* are laid down as follows—"hyphasmate ex albo flavo-rubroque; sporangiis demum coccineis; sporis breviter fusiformibus."

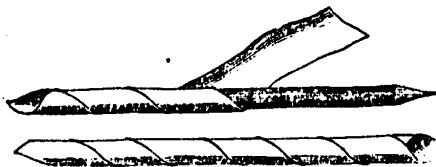
With regard to another subject, that of leprosy, a short account of which lately appeared (Jan., 1863) in this *Review*, I would add that additional information, necessarily omitted here, may be found in the eighth volume of the same "Transactions."—*British and Foreign Medico-Chirurgical Review*.

MEDICATED CIGARETTES.

By W. E. BOWMAN, M.D.

CIGARETTES may be made of almost any variety of thick paper, but that kind should be selected that on burning yields a smoke most easily inhaled. I have always employed the heavy paper used for copy book covers (olive pressings); thick blotting paper, however, makes a good cigarette, but the regular filtering paper does not answer, as its smoke is dense and suffocating.

First, cut the paper into strips about seven inches long and an inch and a quarter wide, and next ascertain how much fluid it requires to saturate twenty-five of these pieces. This is readily done by soaking them in an exactly measured ounce of water, when on withdrawal it will be found that about five fluid drachms of the liquid has been imbibed; this will give the key to the strength you are to make the solutions.



Next saturate the slips with the remedy, and when nearly dry gum or paste one border of each, and roll it around a pencil, as shown in the following wood-cut; afterwards withdraw the pencil, and the cigarette is made.—*Cun. Lan.*